CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH,LLC

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
December 17, 2014

Prepared by
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CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH,LLC

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vac truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 17, 2014 07:00 to December 18, 2014 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for chlorine (Cl_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area. An additional unit (Unit 06) was deployed in conjunction with work operations near frac tanks as recommended by the onsite safety officer. Units 09 and 10 were deployed in the cab of a front-end loader and an excavator supporting solidification operations in the Exclusion Zone. AreaRAE Unit 11 was deployed on Mission Rock Road on the outer fence line of the Santa Clara Waste Water facility primarily to monitor Cl_2 concentrations in the area adjacent to the 120 barrel tank truck. The AreaRAE was placed between the 120 barrel tank truck (staged the previous day) and Mission Rock Road. AreaRAEs were equipped with sensors to detect VOCs, LEL, H_2S, and SO_2. Unit 03 recorded readings for LEL up to 3.2%; CTEH® personnel responding to this event verified these readings were the result of electronic sensor drift, and a new LEL sensor was installed and calibrated in this unit. Unit 02 reported H_2S detections up to 1.3 ppm which was also determined to be caused by electronic sensor drift. CTEH® personnel verified there was no measurable H_2S or percent LEL in the area using handheld instrumentation. Unit 10 reported one (1) instantaneous detection of SO_2 at 0.8 ppm. This concentration was not sustained for more than one 15-second polling interval. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were collocated with AreaRAE stations 1, 2, 3 and 4 and data-logged to monitor PM_{10}. An additional two units were data-logged and placed in the cab with operators in the exacavators supporting solidification operations in the Exclusion Zone. The stationary units were taken offline around 04:00 on 12/18 due to rain. Table 3 summarizes data-logged particulate monitoring data.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
December 17, 2014 07:00 – December 18, 2014 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Community	Cl_2	Gastec 8La	6	0	NA	<0.05 ppm
	H_2S	MR+ / MR Pro	27	0	NA	<1 ppm
	HCl	Gastec 14L	6	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	27	0	NA	<1 %
	O_2	MR+ / MR Pro	27	27	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	6	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	26	26	0.01	0.005 - 0.017 mg/m^3
	SO_2	MR+ / MR Pro	27	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	6	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	27	0	NA	<0.1 ppm
Exclusion Zone	H_2S	MR+ / MR Pro	2	0	NA	<1 ppm
	LEL	MR+ / MR Pro	2	0	NA	<1 %
	O_2	MR+ / MR Pro	2	2	20.9	20.9 - 20.9 %
	SO_2	MR+ / MR Pro	2	0	NA	<0.1 ppm
	VOC	MR+ / MR Pro	2	0	NA	<0.1 ppm
Work Area	Cl_2	Gastec 8La	13	4	0.05	0.05 - 0.05 ppm
		MR+ / MR Pro	11	4	0.05	0.05 - 0.05 ppm
	H_2S	MR+ / MR Pro	29	0	NA	<0.1 ppm
	HCl	Gastec 14L	4	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	37	0	NA	<1 %
	O_2	MR+ / MR Pro	36	36	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	3	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	11	11	0.107	0.004 - 0.9 mg/m^3
	SO_2	MR+ / MR Pro	11	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	4	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	37	0	NA	<0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
December 17, 2014 07:00 – December 18, 2014 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range[2]
Unit 01	H_2S	4774	930	0.1 ppm	0.1 - 0.3 ppm
	LEL	4774	0	NA	< 1 %
	SO_2	4774	2	0.1 ppm	0.1 - 0.1 ppm
	VOC	4774	2	0.4 ppm	0.3 - 0.5 ppm
Unit 02	H_2S	4883	105	0.1 ppm	0.1 - 1.3 ppm
	LEL	4883	0	NA	< 1 %
	SO_2	4883	0	NA	< 0.1 ppm
	VOC	4883	22	0.2 ppm	0.1 - 0.4 ppm
Unit 03	H_2S	4864	188	0.1 ppm	0.1 - 0.1 ppm
	LEL	4864	13	0.022	1.8 - 3.2 %
	SO_2	4864	0	NA	< 0.1 ppm
	VOC	4864	444	0.1 ppm	0.1 - 0.6 ppm
Unit 04	H_2S	4887	20	0.1 ppm	0.1 - 0.1 ppm
	LEL	4889	0	NA	< 1 %
	SO_2	4887	0	NA	< 0.1 ppm
	VOC	4889	0	NA	< 0.1 ppm
Unit 06	H_2S	2113	737	0.1 ppm	0.1 - 0.3 ppm
	LEL	2113	0	NA	< 1 %
	SO_2	2113	0	NA	< 0.1 ppm
	VOC	2113	0	NA	< 0.1 ppm
Unit 09	LEL	1891	0	NA	< 1 %
	SO_2	1891	224	0.1 ppm	0.1 - 0.1 ppm
	VOC	1891	0	NA	< 0.1 ppm
Unit 10	Cl_2	169	0	NA	< 0.1 ppm
	LEL	169	0	NA	< 1 %
	SO_2	169	1	0.8 ppm	0.8 - 0.8 ppm
	VOC	169	0	NA	< 0.1 ppm
Unit 11	Cl_2	4365	8	0.2 ppm	0.1 - 0.4 ppm
	LEL	4365	0	NA	< 1 %
	SO_2	4365	16	0.1 ppm	0.1 - 0.1 ppm
	VOC	4365	488	0.1 ppm	0.1 - 0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 PM_{10} Monitoring Summary[1]
December 17, 2014 07:00 – December 18, 2014 07:00

Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10601072	AR01	878	878	0.004	0.001 - 0.048 mg/m^3
10408087	AR02	2485	2113	0.006	0.001 - 0.351 mg/m^3
10704074	AR03	2601	2532	0.153	0.009 - 0.725 mg/m^3
10503020	AR04	3055	3027	0.008	0.001 - 0.522 mg/m^3
11005015	Excavator 200D	467	467	0.023	0.002 - 0.131 mg/m^3
10704070	Excavator 210G	599	599	0.019	0.001 - 0.161 mg/m^3

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*

Appendix A

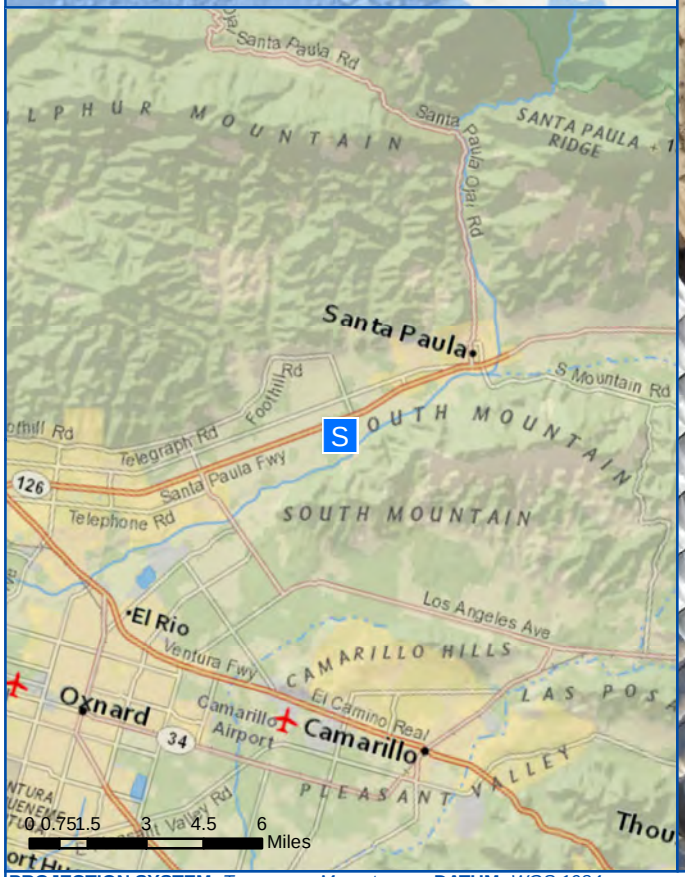
Incident Maps:

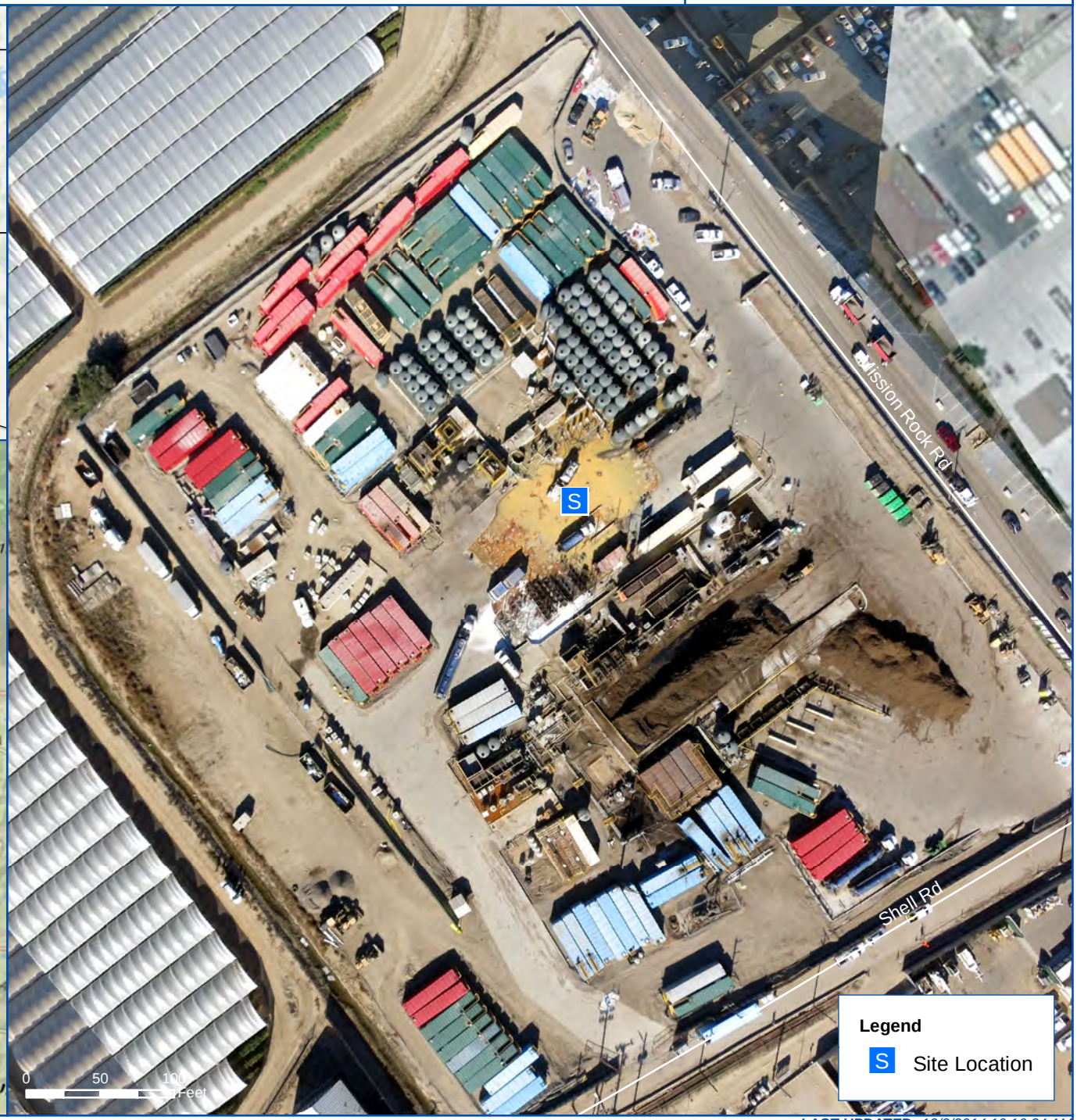
Real-time Air Monitoring Locations and Incident Site

Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura





PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

Aerial Overview - 12/16/2014

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/17/2014 1:47:29 PM*

Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

Manually Logged Real-Time Air Monitoring Concentrations

VOC - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/18/2014 9:00:41 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2SO_4 - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/18/2014 8:59:36 AM*

Manually Logged Real-Time Air Monitoring Concentrations

SO_2 - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/18/2014 8:58:18 AM*

Manually Logged Real-Time Air Monitoring Concentrations

PM_{10} - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/18/2014 8:56:19 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Peroxides - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/18/2014 8:50:30 AM*

Manually Logged Real-Time Air Monitoring Concentrations

O_2 - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84* Print Date: *12/18/2014 8:47:58 AM*

Manually Logged Real-Time Air Monitoring Concentrations

LEL - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/18/2014 8:25:54 AM*

Manually Logged Real-Time Air Monitoring Concentrations

HCl - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/18/2014 8:24:45 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2S - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/18/2014 8:23:41 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Cl_2 - Dec 17, 2014 07:00 to Dec 18, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/18/2014 8:19:57 AM*

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and Location Map

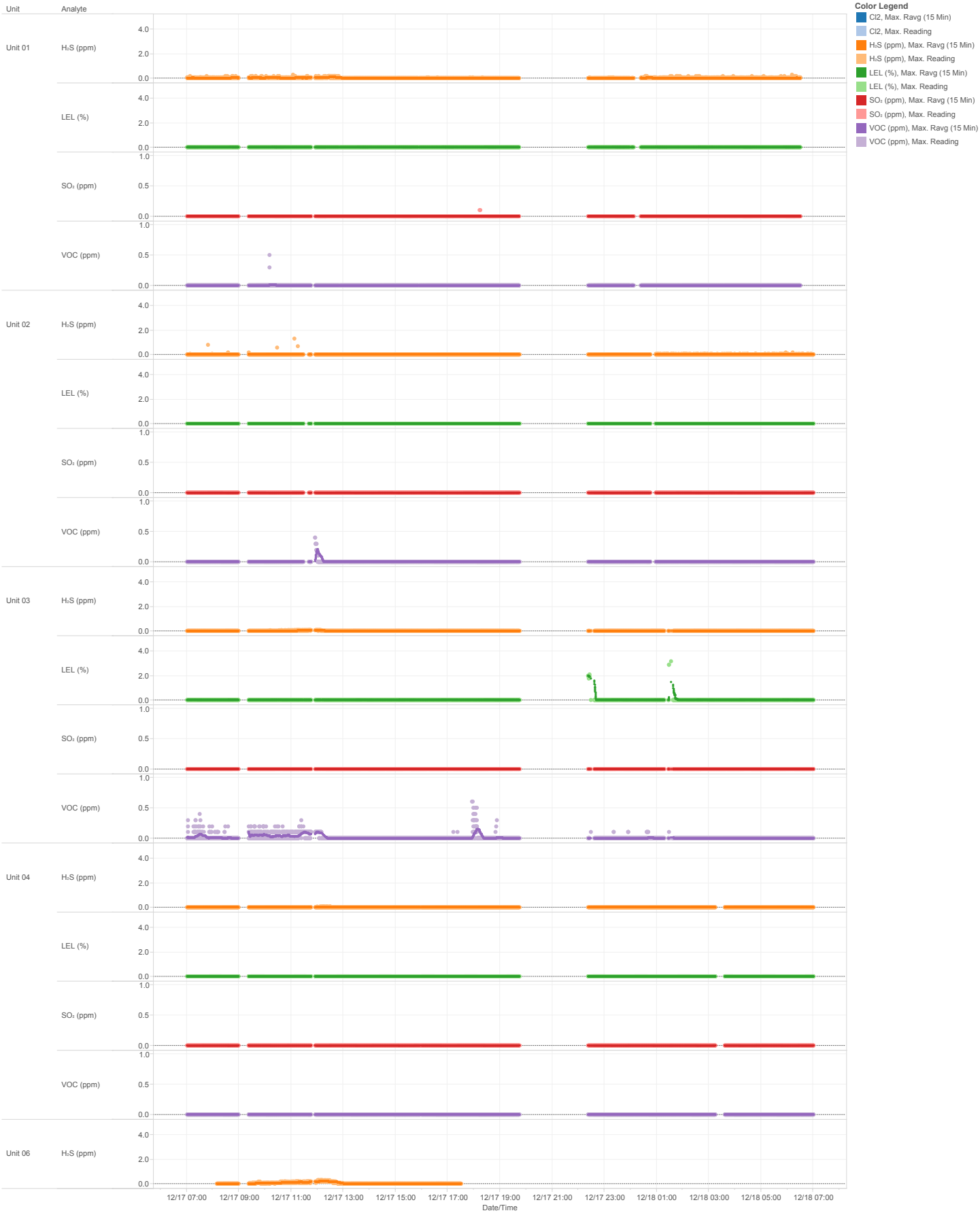
AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

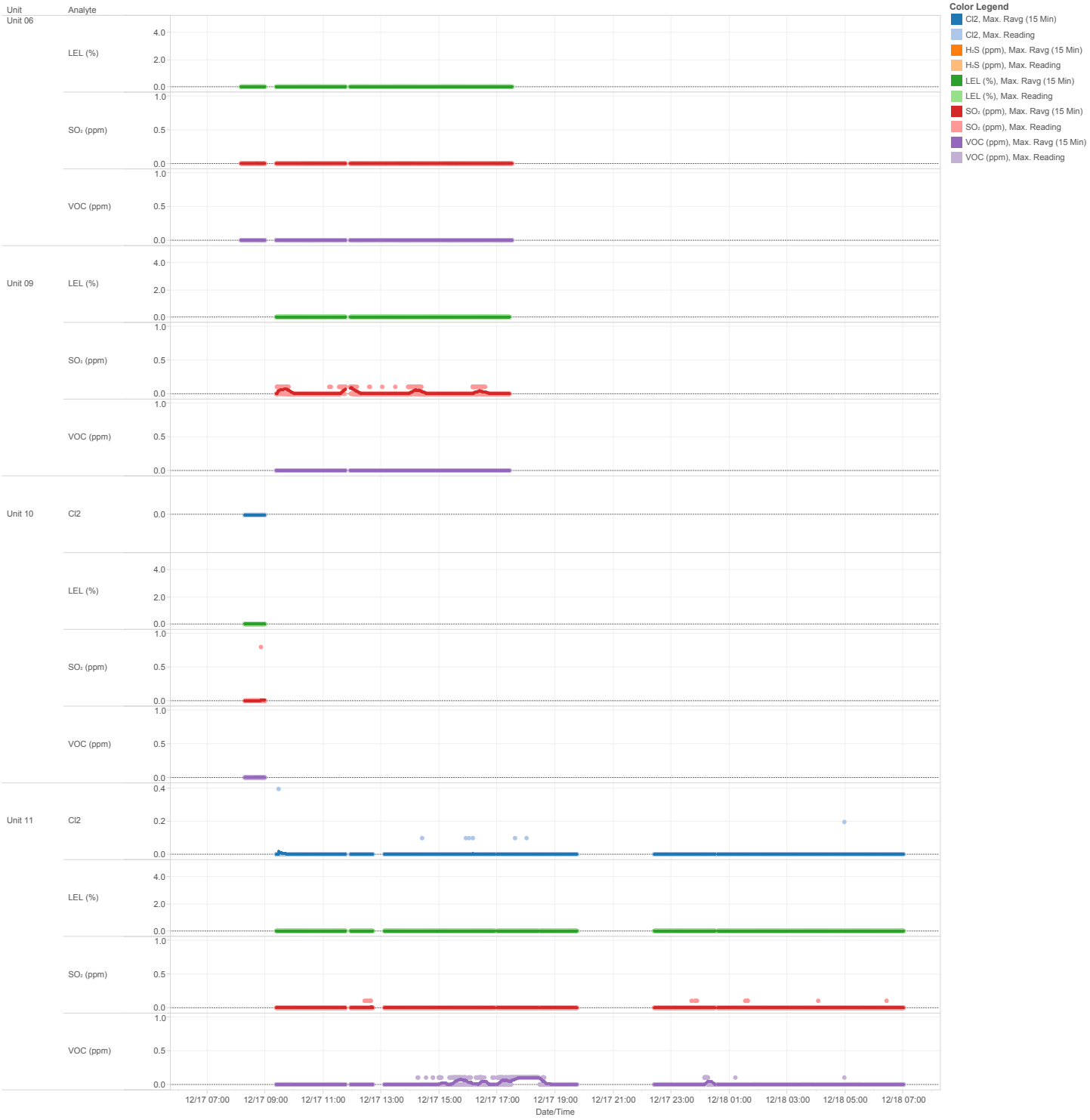
PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/18/2014 5:37:13 PM*

Patriot Environmental
AreaRAE Trend Graphs
12/17/2014 07:00 - 12/18/2014 07:00



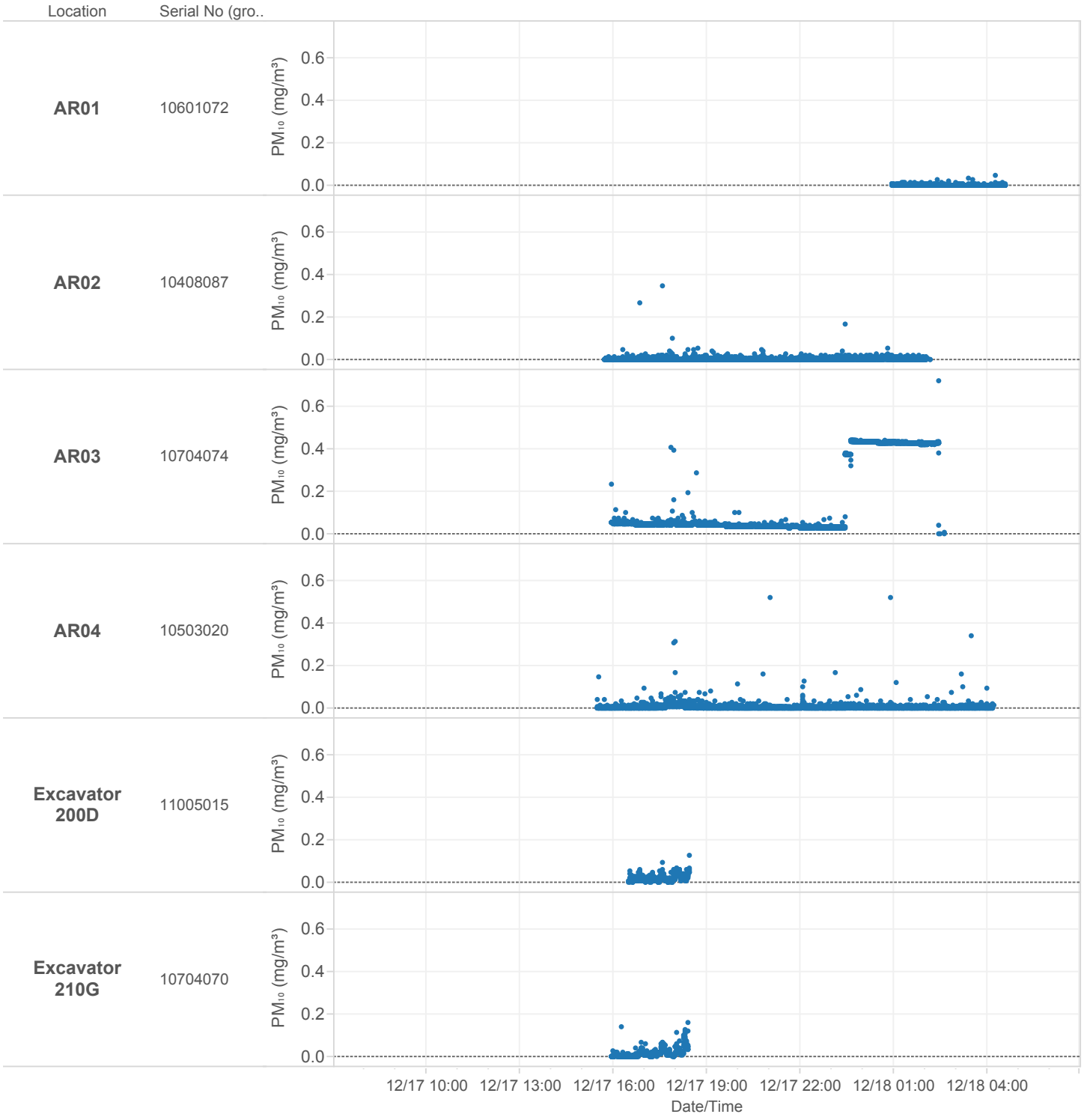
- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
12/17/2014 07:00 - 12/18/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM_{10}) Summary
12/17/2014 07:00 - 12/18/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format